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A Case Study in Applied Behavior Analysis: Increasing Color Receptive Identification Using Positional Prompts

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by

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Dedication

I dedicate this manuscript to my parents, Alicia and Manuel. Thank you for constantly supporting me and believing in me. I could not have done this without the two of you.

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Abstract

Color identification is an important skill because it fosters academic success (Akande, 2000). Positional prompts have been successfully used to teach receptive identification to children diagnosed with autism spectrum disorder (ASD; Leaf et al., 2014; 2016). The purpose of this case study was to increase accuracy of receptive identification of colors using positional prompting. The participant was a 7-year-old boy diagnosed with ASD who could accurately sort colors. The data from this case study indicate that positional prompts proved to be effective in teaching receptive color identification.

Introduction

Color identification is important for a variety of reasons, including drug identification (Stegemann et al., 2017) and academic success (Akande, 2000). The inability to identify colors can pose a safety issue. For instance, individuals who were unable to correctly identify medication due to lacking coloring identification skills have experienced unintentional overdoses, which has been identified as responsible for two-thirds of drug related hospital admissions according to Budnitz et al., (2011). Clinicians and early child educators attest to the difficulty preschool children with ASD experience in learning to identify colors (Akande, 2000). Children with ASD are less accurate than neurotypically developing children when it comes to detecting the differences in colors thus struggle to receptively (i.e., listener responding such as point to named color) and expressively (i.e., tact colors) identify colors (Franklin et al., 2008).

In the past, different interventions have been used to teach color identification. Williams et al., (2005) used a 3-s hands down blocking procedures combined with reinforcement for correct responding to teach a child diagnosed with ASD to identify two colors. The experimenters instructed the child to select a black card or a white card; if the child selected the correct card, the experimenters provided praise. If the child selected the incorrect card, the experimenters gently moved the participant's hands to the tabletop for 3-s, away from the cards (Williams et al., 2005). The results from this study indicated that the blocking procedure paired with reinforcement for correct responding was successful in teaching the participant to identify the colors black and white (Williams et al., 2005).

Positional prompts have also been successfully used to teach receptive identification to children diagnosed with ASD (Leaf et al., 2016). Position prompts entails presenting the target stimulus (i.e., stimulus the child must select in response to the instruction) presented a set distance away from the array to serve as a prompt, usually closer to the participant. Once mastery criteria are reached with the target stimulus presented a certain distance away from the array, the target is moved closer to the array. This process continues until the target is back in the array. Leaf et al., (2016) used positional prompting and reinforcement in the form of verbal praise to teach identification of targets (i.e., receptive identified of preferred stimuli such as comic book characters, college football teams, etc) to six children with ASD. During the first level/step of the positional prompting the target stimulus was placed 12 inches away from the array; once criteria was met the stimulus was moved to six inches away from the array, and then all stimuli were presented in a straight line (Leaf et al., 2016). Results from this study indicated that positional prompting and reinforcement was successful in teaching receptive identification of each participants' target and the performance of most of the participants maintained at mastery criterion at follow-ups (Leaf et al., 2016).

Positional prompts have been also been evaluated in combination with other prompt types (e.g., Leaf et al., 2014). For instance, Leaf et al. (2014) compared flexible prompt fading (i.e., a combination of positional-prompts, physical, pointing, modeling, and field reduction prompts) and error correction procedures (i.e., saying "no" and modeling the correct response). This study aimed at teaching four children diagnosed with ASD to identify Muppet characters. Both procedures proved to effective at teaching four children with ASD to identify Muppet characters and both were associated with high rates of maintenance; however, the flexible prompt fading

procedure was more efficient in teaching the skills to the participants (i.e., fewer trials and time needed to achieve criterion) (Leaf et al., 2014).

It appears that positional prompting has not been used to teach receptive color identification; however, it has been successful in teaching other skills to children diagnosed with ASD (Leaf et al., 2014; 2016). Given its previous success, it may also prove effective in teaching color identification. Therefore, the purpose of this case study was to evaluate the impact of positional prompts on acquisition of receptive identification of colors by a child diagnosed with ASD.

Method

Participant, Setting and Materials

The participant in this study was a 7-year-old boy diagnosed with ASD. Alex had been receiving services including Applied Behavior Analysis (ABA), vision therapy, and speech therapy since he was 4-year-old. He could accurately sort different colored bears and shapes into the correct colored cups. Sessions were completed either in Alex's home, where there was a room containing a table and two chairs, or within a separate room in Alex's after-school program which also contained a table and chairs. Materials included three different colored cups (red, blue, yellow). These cups were identical to each other in size and only varied in color. Datasheets were used to collect data on Alex's performance during the skill acquisition program.

Dependent Measurement, Interobserver Agreement (IOA), and Experimental Design

The target behavior was correct receptive color identification and was defined as Alex touching the colored cup corresponding to the color included in the vocal instruction presented by the implementor (e.g., touching the red cup when the instruction stated "touch red"). Data were collected on a trial-by-trial basis and the percentage of trials with correct responding was calculated by dividing the number of correct responses by the total number of trials (10) in the session, multiplied by 100. Trial-by-trial IOA were calculated by having the implementor's supervisor also collect data on the participant's responding using the same datasheet as the implementor's. The data collected by the supervisor and implementer were compared for each trial and the IOA score was calculated by dividing the number of trials with agreements by the total number of trials in the session (10) multiplied by 100. Interobserver agreement was

assessed for 24% of total sessions completed including the baseline and training sessions and the mean IOA score was 100%. This case study employed an AB design.

Procedures

Overview

Each training session consisted of 10 trials. During each trial, the implementor presented the cups on the table in the prescribed position. Implementer stated, “touch (color) cup” and allow participant 5-s to touch any of the cups with no consequences.

Baseline

Three colored cups (blue, red, yellow) were put in a straight line in front of the participant. There were no consequences provided for correct and incorrect responding.

Training

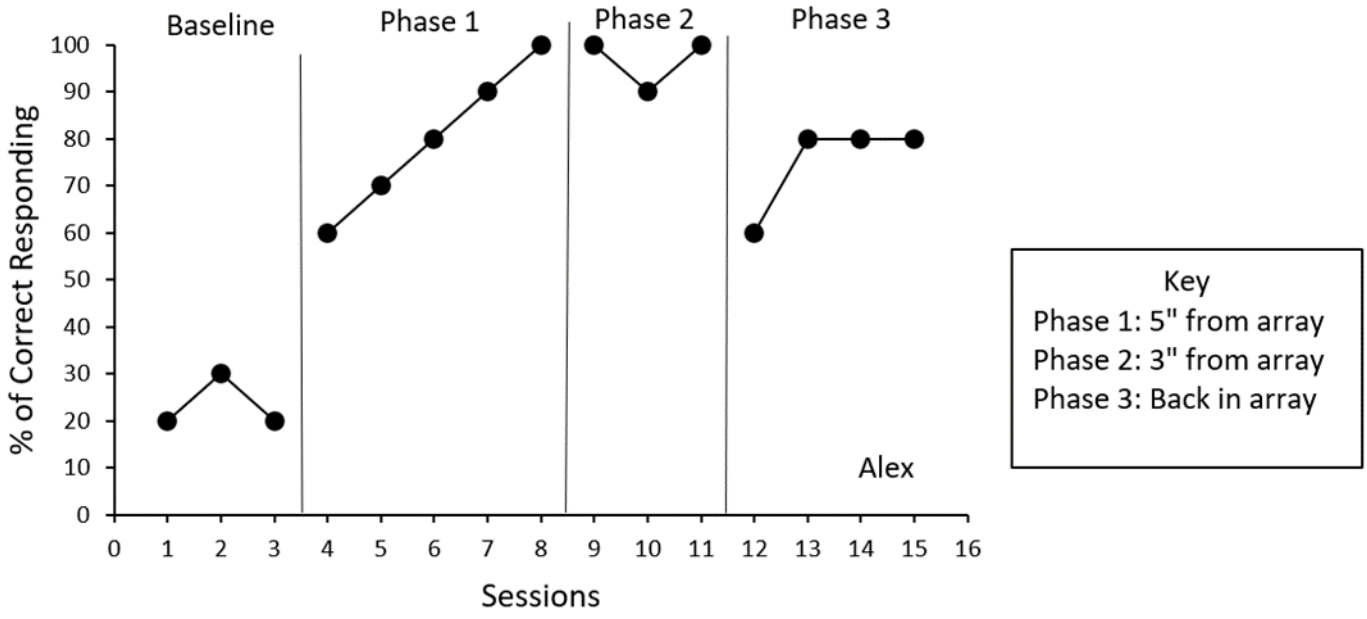
Cups were arranged in a line (i.e., array), but one cup was placed closer to the participant. The implementor stated, “touch (color of cup closest to participant)” and allowed the participant 5-s to touch a cup. If the participant touched the correct cup, the implementor provided praise using an excited tone of voice (i.e., stated “Great job, that’s the _____ cup!”). If the participant did not respond or touched an incorrect cup, the implementor represented the instruction but placed emphasis on name of the color the participant was supposed to touch (e.g., “touch BLUE”). If participant still touched an incorrect cup or did not respond, the implementor pointed to the correct cup while stating, “No, touch the (correct color) cup”. If the participant touched the correct cup, the implementor provided praise in a monotone voice, “that’s the (color) cup”. If the participant made yet another error, the implementor physically guided him to touch the correct cup while repeating the verbal instruction to touch the cup. Correct responses following the physical prompt also resulted in praise delivered in a monotone voice, “that’s the (color) cup”.

Mastery criteria and criteria to move across phases consisted of three consecutive sessions with at least 80% correct responding. During phase one the target stimulus was placed five inches away from the rest of the array. Next, the target stimulus was placed three inches away from the array (phase two). Finally, during phase three the target stimulus was presented within the array (i.e., all three cups in a straight line).

Results

As seen in Figure 1, during baseline Alex's correct responding was low, ranging from 20%-30%. Once training began, Alex moved quickly through phases one and two, meeting criterion within 3-4 sessions. Alex met mastery criterion for phase one within five sessions. Once in phase two, Alex scored 90%-100% in all three sessions, quickly meeting criterion and moving to the next phase. During phase three, Alex first scored 60% but met mastery during the next three sessions scoring 80% in all 3 consecutive sessions.

Figure 1. Percentage of Correct Responding During Each Phase



Discussion

This case study evaluated the impact of positional prompting on receptive color identification. Results indicated that the positional prompts were successful in teaching receptive color identification to a child with ASD. In fact, Alex quickly met mastery criteria for each phase. But, it is important to note that although Alex did meet mastery criteria for this case study, he never met 100% correct responding in phase three.

The results from this study are similar to past studies that used positional prompts and reinforcement to teach receptive identification (Leaf et al., 2014; 2016). However, the procedures included in this case study differ from previous studies in that it targeted a different behavior (i.e. color identification) whereas previous studies taught their participants to receptive identify preferred stimuli and Muppet characters (e.g., Leaf et al., 2014; 2016). Additionally, in the current study the positional prompts consisted of placing the target stimulus 5 inches, then 3 inches, and finally 0 inches from the array. Meanwhile, in Leaf et al., (2016) the target stimulus was placed 12 inches from the array, then 6 inches, and finally 0 inches. Future research should determine the most optimal initial distance and fading steps when using positional prompts

Limitations of this study include lack of replication and maintenance data. Future studies should include replication within and across participants and assess maintenance and generalization of the skills. Additionally, the training phase included additional components other than positional prompts so it is unclear if positional prompts alone would have resulted in acquisition of the target skill. Future research could also complete the same evaluation with participants who do not distinguish between colors (e.g., can't sort items by color) to determine

if that skill is even needed for this intervention to be successful in teaching receptive color identification.

Authors note: Due to the COVID-19 pandemic the thesis requirements for students graduating from the USF ABA program in 2022 have been modified and may include fewer participants or case studies.

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